

not having an antecedent basis in claim 12 for the recited amount of Cr_2O_3 as ranging from 20-60 wt. % of the composite is not understood. Claim 12 recites that the composite contains metal bonded, particulate Cr_2O_3 , but does not recite the amount of the Cr_2O_3 present. Claim 17 merely recites that the amount is from 20-60 wt. %. Therefore, claim 12 provides an antecedent basis for the Cr_2O_3 and having a dependent claim reciting limitations of the amount present is well within the purview of patent practice. Accordingly, the Examiner is respectfully requested to withdraw this rejection of claim 17.

The Rejections Under 35 USC 103

All of the claims stand rejected under the Toyota references Part (1) and Part (2) which the Examiner cites as teaching a self-lubricating composite comprising metal bonded chromium oxide with Ag and fluorides of barium and calcium. The Examiner refers to *In re Aller*, 105 USPQ 233 (CCPA 1955), for reciting that where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.

Reasons for Patentability

Applicants respectfully submit, that when compared on the same basis of volume percent, the compositional difference between the compositions of the claimed invention and the Toyota references are so large as to render the claimed invention outside of the penumbra of obviousness.

It appears that *In re Aller* relates to the "conditions" of temperature and pressure for a chemical reaction, which is not the case here. Further, in this case the court referred to a distinction in a difference of such magnitude as to justify the allowance of the claims, or if it was merely a slight difference in degree. Applicants respectfully refer the Examiner to the cases of *In re Wertheim*, 191 USPQ 90 (CCPA 1976) and *In re Woodruff*, 16 USPQ2d 1934 (Fed. Cir. 1990), which are believed to be more pertinent to the issue at hand, for teaching that a prima facie case of obviousness may exist where the claimed ranges of composition overlap or lie inside ranges disclosed by the prior art. One example given is that "about 1-5 %" allowed for concentrations slightly more than 5 % and that, therefore, there was overlap. In *Titanium Metals v. Banner*, 227

USPQ 773 (Fed. Cir. 1985), the court held as proper a rejection of a claim directed to an alloy of "having 0.8 % nickel, 0.3 % molybdenum, up to 0.1 % iron, balance titanium" as obvious over a reference disclosing alloys of 0.75 % nickel, 0.25 % molybdenum, balance titanium and 0.94 % nickel, 0.31 % molybdenum, balance titanium. These close concentrations are markedly different from the large difference in the concentrations of the major components of applicant's claimed composition, which are the metal binder and the Cr_2O_3 .

Referring the Examiner's attention now to the **Declaration** under 37 CFR 1.132 by coinventor applicant Dr. DellaCorte, it is clear that the ranges of these major constituents are markedly different and do not overlap with respect to the Toyota compositions and those of the claimed invention. In his Declaration, Dr. DellaCorte compares the compositions of the invention and those of the Toyota Part 1 and 2 references, on the same basis of volume percent. The procedure and calculations employed at arriving on the volume percents are set forth in the Declaration. Without these calculations, it was not possible to make comparisons, because some of the data was in weight percent and some on mass percent. The results of these calculations for the Toyota compositions are shown in Tables 1 and 2, on pages 4 and 5 of the Declaration. The results for the compositions of the invention are shown in Tables 3 and 4, on pages 5 and 6 of the Declaration. Table 4 shows the compositions of the invention in both volume and weight percent. A comparative summary of the ranges of these two major constituents is shown in Table 5, on page 6 of the Declaration. The binder metal of the invention ranges from 13.6 to 49.5 volume percent, whereas that of the Toyota compositions lies between 60 and 90 volume percent. This is a very big difference. Similarly, the amount of Cr_2O_3 for the compositions of the invention ranges from 27.2 to 67.1 volume percent, while for the Toyota compositions it lies within 4.4 to 17.8 volume percent. Again, this is a very big difference and no where near the small differences referred to by the courts in the *Wertheim*, *Woodruff*, and *Titanium Metals* cases. Accordingly, it is respectfully submitted that the large differences in the major constituent ranges between the compositions of applicants' claimed invention and the Toyota compositions, and in which there is no overlap, falls outside the obviousness penumbra of the illustrations, holdings and the spirit of these decisions. Further, in the spirit of the *In re Aller* case, it is believed that these differences are of such magnitude as to justify the allowance of the claims.

The Toyota binder is disclosed as a heat resistant nickel alloy (Ni-23.2 Co-17.0 Cr-12.5 Al-0.5 Y). This means that the nickel alloy used was 46.8 % Ni, 23.2 % Cr, 17 % Co, 12.5 % AL and 0.5 % Y. The 12.5 % aluminum is too high for it to be a superalloy. For example, applicants now respectfully direct the Examiner's attention to pages 950, 951, 981 and 982 of the Metals Handbook, Tenth Edition, Volume 1. In the bottom right column on page 950 the first sentence of the last paragraph recites that nickel-base superalloys contain up to about 8 % of aluminum, with no more than 4.9 % shown in the Table on page 951. The fourth line of the middle column on page 981 refers to up to 6 % aluminum in superalloys, while in the Table on page 982 the most aluminum shown is 8 %, with most of the superalloys having not more than 6 %. Thus, the Toyota binder is not a nickel base superalloy as are the alloys of most of applicants' claims.

In view of the foregoing amendments and discussion, it is believed that the claims as amended are patentable and in condition for allowance. Therefore, the Examiner is respectfully requested to withdraw the rejection, allow the claims as amended and pass the application on to issue.

Respectfully submitted,



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June , 1998